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La Vitamina D negli alimenti

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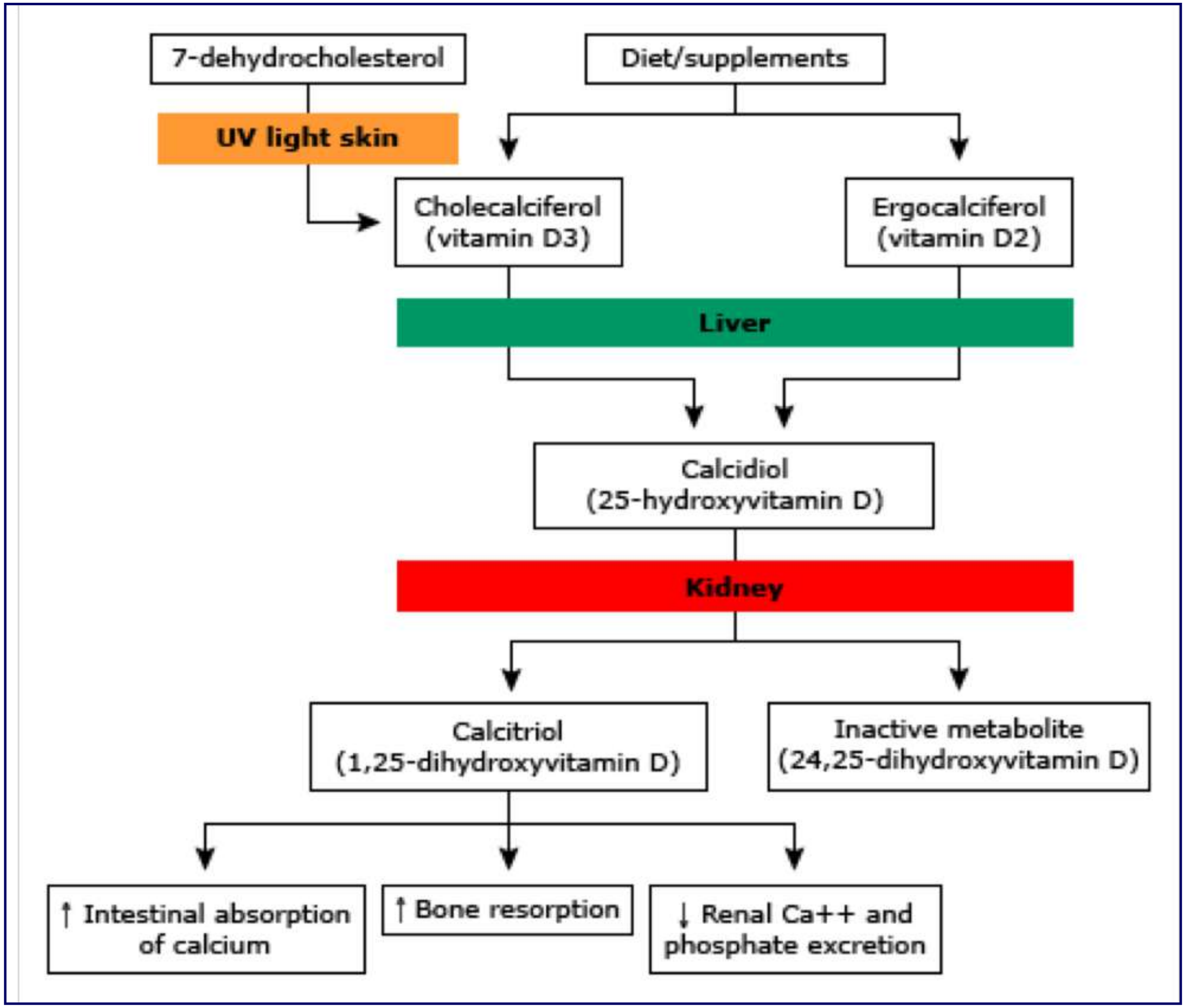
Vitamin D Metabolism



By Agarwal, 2013

Vitamina D negli alimenti

Alimenti	Contenuto medio di vitamina D (UI)
Latte di mucca	5 – 40/l
Latte di capra	5 – 40/l
Burro	30/100 g
Yogurt	2,4/100 g
Maiale	40 -50/100 g
Fegato di Manzo	40 -50/100 g
Dentice, merluzzo bianco, orata, sogliola, trota, salmone e aringhe	300 – 1500/ 100 g
Olio di fegato di merluzzo	400/5 ml
Tuorlo d'uovo	20/100 g

FEMALE POPULATION

	BMI<30 (n=80)	BMI 30≤35 (n=100)	BMI 35≤40 (n=80)	BMI >40 (n=80)	
BMI	27±1.2	32.5±1.5**	37±1.5***	44±2***	**p<0.0001 ***p<0.001
Age	46.5± 15	45± 14	46± 13	43± 14	ns
Cholesterol (mg/dl)	199±54	198±41	204±40	190±32	ns
Col. HDL (mg/dl)	52±13	50±11	50±10	46±10	ns
Triglycerides (mg/dl)	114±79	117±61	130±72	122±68	ns
HOMA	2.8±0.9	3.1±0.8	5.0±2.6***	6.4±2.2***	***p<0.0001
PCR (nmol/L)	2±0.9	2.8±0.9	5.0±1.4**	5.5±2.1**	**p<0.001
Fibrinogen (mg/dl)	346±102	341±63	368±85	421±86**	**p<0.001
PTH (pg/ml)	40±15	42±20	46±23	48±19	ns
25(OH)vit.D	26±9	20±10*	16±8**	15±10**	*p<0.01 **p<0.001

Greco, Francomano, et al., W J Diab 2013

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Development of a Short Questionnaire for the Screening for Vitamin D Deficiency in Italian Adults: The EVIDENCe-Q Project

Rachele De Giuseppe [1,†], Chiara Elena Tomasinelli [1,†], Hellas Cena [1,2,*], Valentina Braschi [1], Francesca Giampieri [3,4], Giorgia Preatoni [1], Domenico Centofanti [5], Maria Pilar Princis [1], Emanuele Bartoletti [5] and Ginevra Biino [6]

Abstract: Background: To develop and validate a questionnaire for the screening of Vitamin D in Italian adults (Evaluation Vitamin D dEficieNCy Questionnaire, EVIDENCe-Q). Methods: 150 participants, attending the 11Clinical Nutrition and Dietetics Operative Unit, Internal Medicine and Endocrinology, Istituti Clinici Scientifici Maugeri IRCCS, of Pavia were enrolled. Demographic variables and serum levels of vitamin D were recorded. The EVIDENCe-Q included information regarding factors affecting the production, intake, absorption and metabolism of Vitamin D. The EVIDENCe-Q score ranged from 0 (the best status) to 36 (the worst status). Results: Participants showed an inadequate status of Vitamin D, according to the current Italian reference values. A significant difference ($p < 0.0001$) in the EVIDENCe-Q score was found among the three classes of vitamin D status (severe deficiency, deficiency and adequate), being the mean score higher in severe deficiency and lower in the adequate one. A threshold value for EVIDENCe-Q score of 23 for severe deficiency, a threshold value of 21 for deficiency and a threshold value of 20 for insufficiency were identified. According to these thresholds, the prevalence of severe deficiency, deficiency and insufficiency was 22%, 35.3% and 43.3% of the study population, respectively. Finally, participants with EVIDENCe-Q scores <20 had adequate levels of vitamin D. Conclusions: EVIDENCe-Q can be a useful and easy screening tool for clinicians in their daily practice at a reasonable cost, to identify subjects potentially at risk of vitamin D deficiency and to avoid unwarranted supplementation and/or costly blood testing.

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production/intake, absorption and metabolism. In particular, we investigated (i) geographical information on the place of residence (north; south; central Italy and urban; peri-urban area residence); (ii) skin phototype (I–IV); (iii) regular outdoor physical activity (at least 150 min/week of moderate-intensity or at least 75 min/week of vigorous-intensity) (yes; no), according to the Italian Health Minister guidelines [22]; (iv) exposure to sunlight for at least thirty minutes, specifying how many times a week (0–7 times) and if during the 10:00 a.m.–3:00 p.m. slot (yes; no); (v) habitual use of sunscreen or cosmetics with a sun protection factor (SPF), specifying if the SPF $\geq$ 15 (yes; no; only during summer) and the frequency of use of sunscreen during sun exposure (one time; two times; three or more times); (vi) monthly use of UV tanning lamps (1 $\leq$ time; 2–3 times; 4–5 times); (vii) consumption of foods containing vitamin D (daily consumption of at least one portion of whole milk and vitamin D fortified foods; weekly consumption of at least three portions of fish; weekly consumption of at least two eggs; weekly consumption of at least two portions of dairy products); (viii) presence of certain pathologies that interfere with the production and absorption of vitamin D (e.g., liver failure, renal failure, nephrotic syndrome, hyperparathyroidism, intestinal malabsorption including Crohn's disease, ulcerative colitis, celiac disease, cystic fibrosis, eating disorders) (yes; no); (ix) drug therapies (e.g., anticonvulsants, antipsychotics, glucocorticoids, immunosuppressive corticosteroids, anti-retroviral, weight-loss drugs, cholesterol-lowering drugs, laxatives) (yes; no); (x) use of multivitamin supplements or supplements containing vitamin D (yes; no).

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Adherence to Dietary Recommendations of 7-Year-Old Children from a Birth Cohort in Friuli Venezia Giulia, Italy

Elisa Giordani [1], Michela Marinoni [1], Federica Fiori [1,*], Federica Concina [2], Luca Ronfani [2], Patrizia Dalmin [2], Fabio Barbone [1,3], Valeria Edefonti [4,*] and Maria Parpinel [1]

Abstract: Few Italian and European studies have assessed adherence to dietary recommendations in primary school children using dietary records. No Italian studies have provided an index-based nutritional adequacy assessment. We provided a comprehensive overview of dietary intake in 381 7-year-old children from NAC-II cohort study, Friuli Venezia Giulia (Italy). Energy, macro-, and micronutrient intakes were derived from 3-day dietary records. Standard (median and percentage) and index-based (Nutrient Adequacy Ratio (NAR) and Mean Adequacy Ratio (MAR)) approaches were used to evaluate adequacy to Italian dietary reference values at nutrient- and overall-diet-level. Percentage contribution of macronutrients to energy intake (%En) was unbalanced towards total fats and protein. In 25% of children, total fats intake exceeded the reference intake upper limit. In ~63% of children, protein intake was at least doubled in their child-specific population reference intake. Median intakes of sodium (1.7 g/day), saturated fatty acids (12.2 %En), and soluble carbohydrates (19.4 %En) exceeded the suggested dietary target in most (65–84%) children. Inadequacy was also observed for micronutrients, with median NARs ranging from 0.11 (vitamin D) to 0.90 (zinc). The median MAR was 0.75 (0.69–0.79), with 1 indicating optimal overall dietary intake. In conclusion, the enrolled children showed suboptimal intakes of several macro- and micronutrients, in line with Italian and European studies on primary school children. Based on the current findings, public health interventions may be targeted to specific nutrients or subpopulations.

UPSALA JOURNAL OF MEDICAL SCIENCES, 2016
VOL. 121, NO. 4, 271–275
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ORIGINAL ARTICLE

OPEN ACCESS

Dietary habits, nutrient intake and biomarkers for folate, vitamin D, iodine and iron status among women of childbearing age in Sweden

Wulf Becker, Anna Karin Lindroos, Cecilia Nälsén, Eva Warensjö Lemming and Veronica Öhrvik

ABSTRACT

Background: Dietary intake and nutritional status are important for pregnancy and pregnancy outcomes. Dietary advice on folate, targeted to women of childbearing age, aims at preventing neural tube defects in the offspring.

Aim: To describe food and nutrient intake and nutritional status among women of childbearing age in Sweden in relation to current nutrition recommendations.

Methods: Dietary intake was assessed using a web-based four-day consecutive food record among adults aged 18–80 years—'Riksmaten 2010–11 adults'. In a subsample, biomarkers of folate, vitamin D, iodine, and iron status were assessed.

Results: Women of childbearing age had lower intakes of fruit and vegetables, fish, and whole grains, but higher intakes of soft drinks. Macronutrient composition was generally in line with the Nordic Nutrition Recommendations, except for a lower intake of fibre, a higher intake of saturated fatty acids, and added sugars. Mean intakes of vitamin D, folate, and iron were below recommended intakes (RI). Median urinary iodine concentration (UIC) was 74 µg/L, 20% had insufficient vitamin D status, and 3% low folate concentrations with no age differences. Furthermore, 29% of women 18–44 years of age had depleted iron stores.

Conclusions: The dietary pattern among women of childbearing age (18–44 years) was less favourable compared to older women. Intakes of some micronutrients were below RI, but no differences in vitamin D, folate, or iodine status between age groups were observed. However, improvements of folate and iodine status among women of childbearing age are warranted. This can be achieved by following dietary guidelines including use of folic acid-containing supplements.

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Table 2. Intake of energy, added sugar, whole grains, vitamin D, folate, iron, and heme-iron among women in Riksmaten 2010–11. Mean per day and per 10 MJ.

		Energy	Whole grains		Vitamin D		Folate		Iron		Heme-iron	
Age group	*n*	MJ/d	g/d	g/10 MJ	µg/d[a]	µg/10 MJ	µg/d[a]	µg/10 MJ	mg/d	mg/10 MJ	mg/d	mg/10 MJ
18–30 years	202	7.6	35	45	5.2	6.7	223	298	8.9	11.9	0.99	1.38
31–44 years	247	7.6	38	52	6.2	8.3	247	334	9.7	12.9	1.21	1.62
45–64 years	358	7.3	40	56	6.6	9.2	263	365	9.9	13.8	1.19	1.62
65–80 years	198	7.1	43	60	7.6	10.7	275	388	9.4	13.3	1.12	1.62
All	1005	7.4	39	54	6.4	8.8	253	349	9.5	13.1	1.14	1.57

[a]Excluding supplements.

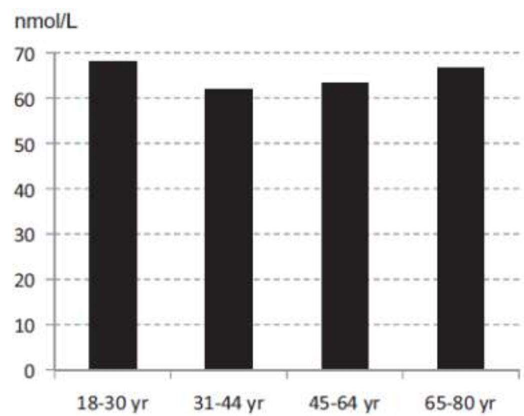

Figure 4. Means of plasma 25(OH)D (nmol/L) among women in the subsample.

nutrients

Nutrients 2021, 13, 4430. https://doi.org/10.3390/nu13124430

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Article

Dietary Intake of the Italian PHIME Infant Cohort: How We Are Getting Diet Wrong from as Early as Infancy

Federica Concina [1], Paola Pani [1,*], Claudia Carletti [1], Giulia Bravo [2], Alessandra Knowles [1,*], Maria Parpinel [2], Luca Ronfani [1] and Fabio Barbone [2,3]

Abstract: Unhealthy dietary habits established in early infancy may lead to under or over nutrition later in life. This paper describes the energy, nutrients and food-type intake of 18-month-old infants belonging to the Italian PHIME cohort (n = 389) and evaluates adherence to the Italian dietary reference values (DRVs). Infant dietary data were collected using 7-day dietary records. Mean energy, macro and micronutrient intakes were estimated and compared with the DRVs. The percentage contribution of 19 selected food groups to total energy and macro- and micronutrient intake was determined with the aim of establishing the main food sources. Most infants' diet shared common characteristics: poor variety, excessive intake of proteins (16.5 E% vs. 8–12 E% DRV) and saturated fatty acids (SFAs) (13.8 E% vs. <10 E% DRV), mainly derived from milk and dairy products, and low intake of total fats (33.2 E% vs. 35–40 E% DRV), polyunsaturated fatty acids (PUFAs) (3.1 E% vs. 5–10 E% DRV), vitamin D (1.1 vs. 15 µg/day DRV) and iron (4.5 vs. 8 mg/day DRV). The unbalanced distribution of macronutrients was reflected in energy intakes outside DRV ranges for more than half the infants. Public health interventions promoting healthy eating habits from early on, even from pregnancy, could yield significant short- and long-term health benefits.

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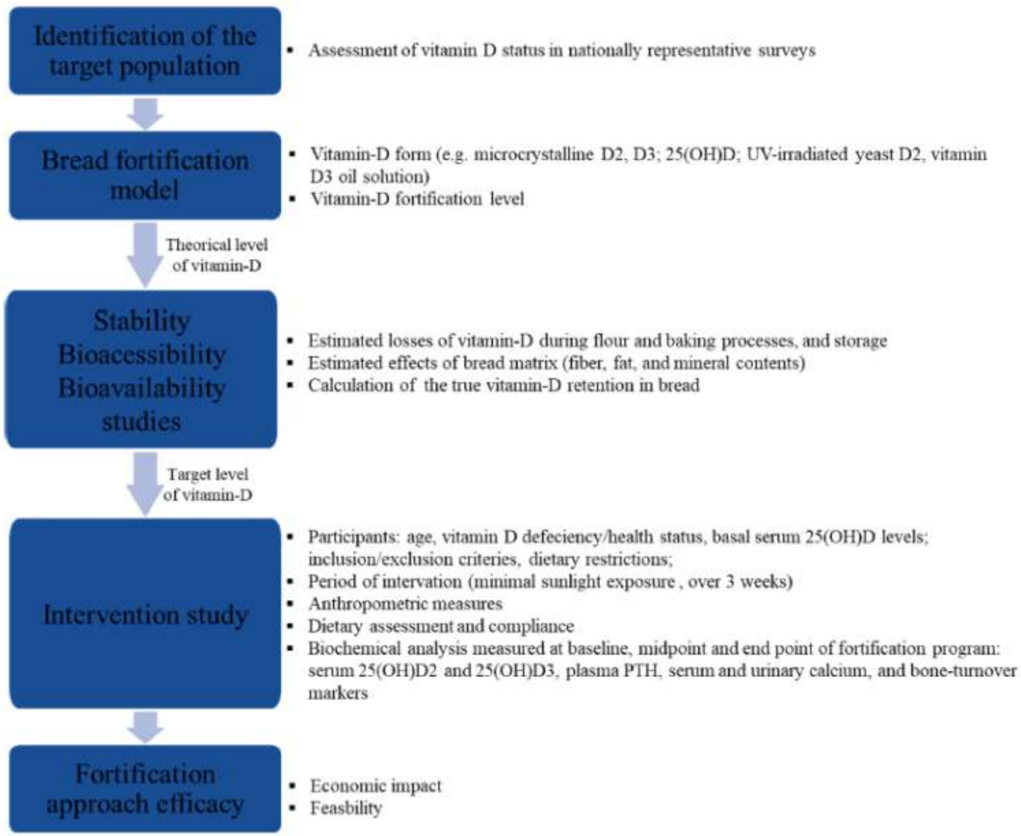
Review

Vitamin D-fortified bread: Systematic review of fortification approaches and clinical studies

Suene V.S. Souza [a], Nuno Borges [a,b], Elsa F. Vieira [c]



Proceedings of the Nutrition Society, Page 1 of 9 doi:10.1017/S0029665121003803

Conference on Nutrition, health and ageing – translating science into practice Postgraduate Symposium

Using food fortification to improve vitamin D bioaccessibility and intakes

A. F. McCourt and A. M. O'Sullivan*

Table 1. Characteristics of vitamin D food fortification data modelling studies

Ref	Year	Region	Population group	Food	Vitamin D dose
(10)	2007	Finland	Adults	Dairy products, bread juice, cereals, jam, sweets, soft drinks, biscuits, mineral water, salad dressings and snacks	0·72–5·50 μg/418·4 kJ (100 kcal)
(66)	2013	Germany	Infants, children, adults and older adults	Milk and milk products, bread and juice	3·1–249·9 μg/100 g
(24)	2015	UK	Infants, children, adults and older adults	Wheat starch and milk containing foods	2·5–10·0 μg/100 g
(26)	2017	Ireland	Children	Cow's milk	1·0–2·0 μg/100 ml
(22)	2018	Denmark	Women	Yogurt, cheese, eggs and crispbread	20 μg/d total
(23)	2019	Belgium	Children and adults	Breakfast cereals, fats, juices and dairy	0·0–1·0 μg/100 g
(67)	2019	England and Wales	Infants, children, adults and older adults	Starch	10·0 μg/100 g
(27)	2020	Ireland	Older adults	Cow's milk and bread	1·5–5·0 μg/100 g
(25)	2021	UK	Children, adults and older adults	Cow's milk	1·0–2·0 μg/100 ml
(68)	2021	The Netherlands	Adults	Bread, milk*, oils, juices, spreads, breakfast cereals	Not stated

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Table 3. Characteristics of vitamin D fortification randomised controlled trials

Ref	Year	*N*	Food	Vitamin D dose	Location	Population	Age (years)	Duration (weeks)	Season	25(OH)D analysis
(52)	2011	24	Mushroom soup	700 µg/portion	Germany	Adults	<45	5	Jan–Mar	RIA
(53)	2012	40	Malted drinks	5 µg/portion 10 µg/portion	UK	Adults	18–65	4	Feb–Mar	UPLC-MS/MS
(55)	2013	165	Cow's milk	5 µg/portion	Spain	Women	18–35	16	Jan–May	ELISA
(58)	2014	49	Cow's milk	2 µg/portion	Japan	Women	18·5*	8	May–Jul	RIA
(63)	2014	152	Snack bar	25 µg/portion	USA	Adults	18–72	9	Feb–Apr	RIA
(69)	2015	335	Biscuit and juice	15 µg/portion	UK	Women	20–64	12	Oct–Mar	HPLC-MS/MS
(59)	2015	102	Mozzarella	0·75 µg/portion 100 µg/portion	Canada	Adults	18–70	10	Feb–Apr	CLIA
(13)	2016	33	Bread	25 µg/portion	Finland	Adults	20–40	8	Feb–Apr	IEMA
(54)	2016	90	Bread	25 µg/portion	Iran	Adults	20–60	8	Feb–Mar	HPLC
(61)	2017	133	Yogurt	5 µg/portion 10 µg/portion	France	Women	55–75	14	Jan–Aug	ELISA
(60)	2017	79	Gouda	5·7 µg/portion	Greece	Women	55–75	8	Jan–Mar	LC–MS/MS
(28)	2019	143	Yogurt, cheese, eggs and crisp bread	20 µg/portion	Denmark	Women	18–50	12	Jan–Mar	LC–MS/MS
(56)	2019	133	Cow's milk	15 µg/portion	Malaysia	Women	30–50	52	Not reported	IDLC-MS/MS
(62)	2019	40	Yogurt	5 µg/portion	France	Women	65+	13	Sep–Jan	RIA
(57)	2020	144	Cow's milk	7·5 µg/portion	Australia	Women	45–65	17	All	LC-MS/MS

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Table 4. Circulating 25(OH)D in vitamin D fortification randomised controlled trials

		Intervention group				Placebo control group			
Ref	Year	Food	Baseline 25(OH)D (nmol/l)	Post 25(OH)D (nmol/l)	Δ 25(OH)D (nmol/l)	Food	Baseline 25(OH)D (nmol/l)	Post 25(OH)D (nmol/l)	Δ 25(OH)D (nmol/l)
(52)	2011	D_2 mushroom soup	34·0 ± 11·0	56·7 ± 7·2	22·7±[b]	Placebo soup	38·7 ± 14·2	28·7 ± 8·7	−10·0 ± [b]
		D_2 supplement	28·7 ± 10·0	58·0 ± 11·2	29·3±[b]				
(53)	2012	5 μg D_2 malted drink	48·0 ± 26·6	52·9±[b]	4·9 (−2·3, 12·7)	Placebo malted drink	62·9 ± 20·8	63·2 ± 18·3	0·3 ± [b]
		5 μg D_3 malted drink	41·9 ± 14·1	55·5±[b]	13·6 (4·1, 23·0)				
		10 μg D_2 malted drink	31·3 ± 22·1	43·2±[b]	11·9 (2·7, 21·2)				
		10 μg D_3 malted drink	30·9 ± 29·1	50·6±[b]	19·7 (9·4, 30·1)				
(55)	2013	D_3 skimmed cow's milk	62·3 ± 20·8	71·2 ± 21·1	8·9±[b]	Placebo cow's milk	62·9 ± 20·8	59·4 ± 19·6	−3·5 ± [b]
(58)	2014	Vitamin D cow's milk	23·1 ± 4·7	36·0 ± 8·4	12·9±[b]	No placebo control group			
(63)	2014	D_3 snack bar	57·9 ± 25·7	69·9 ± 15·0	12·0±[b]	Placebo bar	51·5 ± 20·3	61·4 ± 13·8	9·9 ± [b]
(69)	2015	D_2 juice, placebo biscuit	[a]44·9 (37·8, 52·0)	[a]59·7 (53·9, 65·4)	[a]14·8 ([b])	Placebo juice, placebo biscuit	[a]44·8 (37·5, 52·1)	[a]33·5 (27·8, 39·3)	[a]−11·2 (16·7, −5·8)
		Placebo juice, D_2 biscuit	[a]46·1 (38·9, 53·4)	[a]61·9 (56·0, 67·7)	[a]15·8 ([b])				
		D_3 juice, placebo biscuit	[a]42·3 (35·4, 49·2)	[a]74·0 (68·1, 79·9)	[a]31·7 ([b])				
		Placebo juice, D_3 biscuit	[a]41·9 (34·9, 48·9)	[a]73·0 (67·1, 78·9)	[a]31·1 ([b])				
(59)	2015	5 μg D_3 mozzarella	48·9 ± 24·4	53·8 ± 22·9	5·1 ± 11·1	No placebo control group			
		700 μg D_3 mozzarella	44·2 ± 21·1	117·4 ± 23·5	72·9 ± 21·9				
(13)	2016	D_2 bread, placebo	64·6 ± 15·1	Not stated	Remained at baseline	Placebo bread + supplement	66·2 ± 18·6	Not stated	Remained at baseline
		Bread, D_2 supplement	63·5 ± 11·3	Not stated	9·6±[b]				
		Bread, D_3 supplement	66·6 ± 14·8	Not stated	17·0±[b]				
(54)	2016	D_3 bread, placebo supplement	33·9 ± 21·9	72·9 ± 23·1	39·0 ± 22·6	Placebo bread + supplement	34·7 ± 30·5	25·4 ± 21·8	−9·2 ± 12·3
		Bread, D_3 supplement	35·0 ± 38·7	63·9 ± 31·0	28·9 ± 31·2				
(61)	2017	5 μg D_3 yogurt	36·5 ± 14·6	52·6 ± 17·0	16·1±[b]	Placebo yogurt	36·4 ± 15·8	49·5 ± 18·8	13·1 ± [b]
		10 μg D_3 yogurt	35·9 ± 14·8	58·9 ± 19·9	23·0±[b]				
(60)	2017	D_3 cheese	47·3 ± 15·2	52·5 ± 12·0	5·14±[b]	Placebo cheese	42·9 ± 17·7	38·3 ± 18·9	−4·59 ± [b]
(28)	2019	D_3 yogurt, cheese, eggs and crispbread	53·3 ± 17·0* 44·5 ± 21·0†	77·8 ± 14·0* 54·7 ± 18·0†	26·4 ± 16·0* 10·5 ± 18·0†	Placebo yogurt, cheese, eggs & crispbread	46·2 ± 19·0* 49·0 ± 23·0†	44·0 ± 17·0* 54·7 ± 18·0†	−2·8 ± 9·0* −11·2 ± 12·0†
(56)	2019	D_3 cow's milk drink	53·2±[b]	60·8±[b]	7·6±[b]	Placebo cow's milk	48·6±[b]	55·0 ± [b]	6·4 ± [b]
(62)	2019	D_3 yogurt	52·6 ± 14·3	Not stated	Remained at baseline	Placebo yogurt	47·0 ± 16·2	Not stated	Not stated
(57)	2020	D_3 cow's milk	61·6 ± 21·4	Not stated	9·1 (5·7, 12·4)	Placebo cow's milk	64·2 ± 24·7	Not stated	−11·8 (−15·3, −8·2)

foods

Foods **2022**, *11*, 631. https://doi.org/10.3390/foods11050631

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Article

Nutrient-Optimized Beef Enhances Blood Levels of Vitamin D and Selenium among Young Women

Anna Haug [1], Cees Vermeer [2], Lene Ruud [3], Milena Monfort-Pires [3], Vladana Grabež [3] and Bjørg Egelandsdal [3,*]

Abstract: Bovine meat provides healthy nutrients but has also been negatively linked to greenhouse gases and non-communicable diseases. A double-blind intervention study was carried out to compare beef meat from bulls fed with feed supplemented with selenium, vitamin D, E, K (SeDEK-feed), and *n*-3, or REGULAR feed. Thirty-four young healthy women (19–29 years old) consumed 300 g of these beef types per day for 6 days in a cross-over design. Diet registrations, blood samples, anthropometric measurements, and clinical data were collected four times. Both beef diets were higher than their habitual diet in protein, fat, saturated fat, and several micronutrients; contained more vegetables and fewer carbohydrates and were followed by a higher feeling of satiety. The SeDEK beef had higher amounts of selenium, vitamin 25-hydroxyvitamin D3 (25(OH)D3), E, and K (MK4), and increased serum selenium and 25(OH)D3 from the participants' normal values if they were below 85 μg/L of selenium and 30 nmol of 25(OH)D3/L, respectively. Our study showed that optimized beef increased serum selenium in young women having moderate selenium levels and improved blood 25(OH)D3 in a woman having low to normal 25(OH)D3. Meat should be optimized to increase specific consumer groups' needs for selenium and vitamin D.

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Table 1. Measured nutrient contents in minced beef meat; control bulls (REGULAR) and bulls fed nutrient optimized composite feed (SeDEK) [39]. Reproduced with permission from Kaveri Thakuria, Meat Science, Elsevier, 2022.

In 100 g [a]	REGULAR	SeDEK
	N = 6 Bulls	N = 6 Bulls
Selenium, µg	10.0	12.6
Myoglobin [b], g	0.38	0.45
Alpha-tocopherol, mg	0.16	0.65
K_1, µg	2.1	2.0
MK4, µg	9.1	20.3
Vit D3, µg	<0.01	0.04
25(OH)D3, µg	0.10	0.29
Cholesterol, mg	73.0	57.5
Fat, g	13.6	14.9
C14:0, g	0.36	0.39
C16:0, g	3.35	3.48
C16:1 *n*-7, g	0.37	0.42
C18:0, g	2.59	2.82
C18:1 *n*-9, g	5.01	5.56
C18:1 trans, g	0.43	0.47
C18:2 *n*-6, g	0.27	0.25
C18:3 *n*-3, g	0.059	0.070
C20:4 *n*-6, g	0.032	0.029
C20:5 *n*-3, g	0.006	0.006
C22:5 *n*-3, g	0.017	0.019
n-6/*n*-3	3.6	2.9

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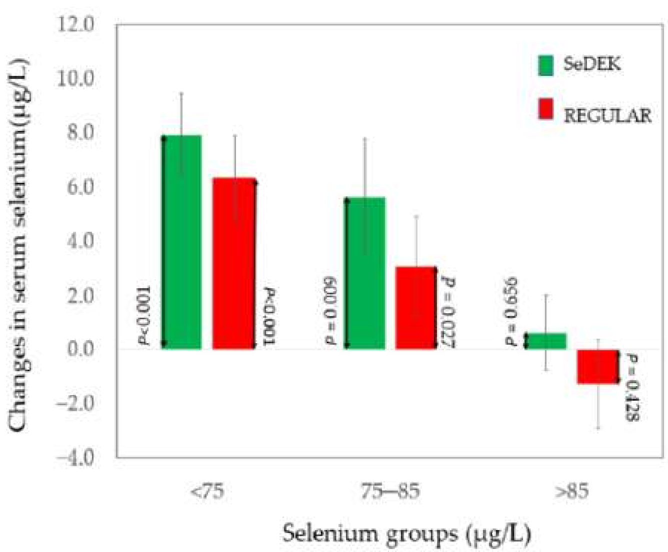
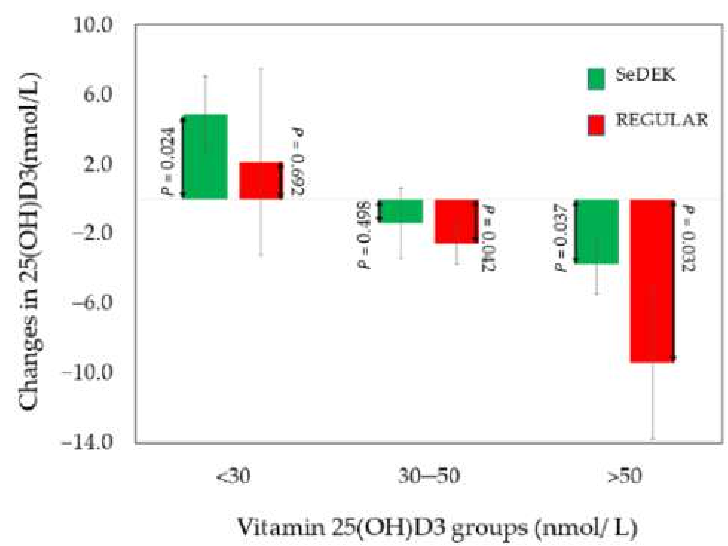
Nutrient-Optimized Beef Enhances Blood Levels of Vitamin D and Selenium among Young Women

Anna Haug [1], Cees Vermeer [2], Lene Ruud [3], Milena Monfort-Pires [3], Vladana Grabež [3] and Bjørg Egelandsdal [3,*]





Vitamina D: quale fonte?